What is claimed is:

1. A thermal collection system comprising:

a first tank for storing relatively hot working fluid,

a second tank for storing relatively cold working fluid,

a heat exchanger connected for receiving said relatively hot working fluid from said first tank for providing heat to said heat exchanger, said heat exchanger discharging said working fluid at a lower temperature than a temperature of said relatively hot working fluid of said first tank;

a solar collector connected for receiving the lower temperature working fluid from said heat exchanger and for heating said lower temperature working fluid, heated working fluid output from said solar collector being fed to at least one of said first tank and said second tank;

said second tank having a control valve selectively operative for permitting working fluid from said second tank to flow to said solar collector.

2. The thermal collection system as recited in claim 1 wherein flow of said working fluid from said second tank through said control valve is controlled such that the total working fluid flow to said solar collector from both said second tank and said heat exchanger is maintained at a maximum value during a portion of the day in which a peak solar flux is incident on said solar collector and also during at least part of a non-peak portion of the day.

3. The thermal collection system as recited in claim 2 wherein said flow of said working fluid from said second tank through said control valve is controlled by means of a flow meter/controller connected in series with said control valve and which adjust the flow of working fluid therethrough.

4. The thermal collection system as recited in claim 2 wherein said maximum value corresponds to an un-cooled temperature capability of the solar collector.

5. The thermal collection system as recited in claim 1,

wherein said first tank, said second tank, said heat exchanger, said control valve and said solar collector form a thermal energy collection and storage system (TCS), and said working fluid passing through said TCS is defined as a TCS working fluid; and

wherein said heat exchanger is arranged in a thermal energy conversion (TEC) system comprising said heat exchanger serving as a heater-vaporizer, an expander, a condenser and a pump all connected in series, and a working fluid of said TEC, defined as a TEC working fluid, is heated by the TCS working fluid.

6. The thermal collection system as recited in claim 5,

wherein said heater-vaporizer is driven by TCS working fluid from the first tank, with the TCS working fluid exhaust temperature is only slightly above the temperature of the condensed TEC working fluid.

7. The thermal collection system as recited in claim 6 where in the TCS working fluid exhaust temperature is 5-10 F above the temperature of the condensed TEC working fluid.

8. The thermal collection system as recited in claim 5 wherein said expander comprises a Rankine cycle engine expander supplied with said TEC working fluid vapor from the heater-vaporizer, which expands the TEC working fluid to low temperature (e.g. 80-100 F) and low pressure (e.g. 15-25 psia).

9. The thermal collection system as recited in claim 5 wherein said condenser takes the form of a condenser-radiator that condense the expanded TEC working fluid, being cooled by atmospheric air blown over heat transfer surfaces of said condenser-radiator.

10. The thermal collection system as recited in claim 5 wherein said condenser takes the form of a condenser-radiator that condense the expanded TEC working fluid, being cooled by cooling water.

11. The thermal collection system as recited in claim 5 wherein said pump pressurize the TEC working fluid exhausted from the condenser, and supplies it back to the heater-vaporizer.

12. The thermal collection system as recited in claim 1 further comprising a third control valve connected for selectively feeding working fluid from said heat exchanger to said second tank or to said solar collector.

13. The thermal collection system as recited in claim 1 further comprising a third control valve connected for selectively feeding working fluid from said heat exchanger to said second tank or to said solar collector through said control valve.

14. The thermal collection system as recited in claim 1, wherein:

said first tank, said second tank, said heat exchanger, said control valve and said solar collector form a thermal energy collection and storage system (TCS), and said working fluid passing through said TCS is defined as a TCS working fluid; and

wherein solar flux thermal energy incident on said solar collector is removed by cooling from the TCS working fluid, said cooling accomplished at the maximum un-cooled temperature capability of the solar collector by control of the flow rate of the TCS working fluid into and through the solar collector.

15. The thermal collection system as recited in claim 5 wherein said first tank is filled from the working fluid exiting said solar collector when a temperature of said working fluid equals or exceeds a design operating temperature Tdrv for driving said heater-vaporizer of said TEC.

16. The thermal collection system as recited in 5 wherein:

said expander comprises a Rankine cycle thermal conversion power system capable of turning an engine shaft, to drive an electrical generators;

said solar collector is fabricated in the form of a flat plate collector based on mass-manufactured refrigerator or refrigerator-derived flat-plate cooler plates, and

said heat exchangers fabricated from mass-produced automotive radiators.

17. The thermal collection system as recited in 16 wherein

said first tank takes the form of an underground storage tank, formed as a concrete lined pool, into which said heat exchanger is submerged, to permit TCS working fluid of said heat exchanger to heat and vaporize the TEC working fluid.

18. The thermal collection system as recited in 5 further comprising a plurality of solar collectors mounted on an L shaped bracket for supporting said collectors an a desired angle of inclination to permit solar light strike said collectors at a normal angle of incidence during peak flux portions of the day.

19. The thermal collection system as recited in 1 further comprising a plurality of solar collectors mounted on an L shaped bracket for supporting said collectors an a desired angle of inclination to permit solar light strike said collectors at a normal angle of incidence during peak flux portions of the day.

20. The thermal collection system as recited in 5 wherein said expander comprises at least one automotive engine such that the engine utilize the TEC working fluid to provide expansion fluid for driving a Rankine cycle.

21. The thermal collection system as recited in 20 wherein said expander comprised a plurality of automobile engines.

22. The thermal collection system as recited in 20 wherein said automobile engine is modified to have a valve timing to give two-cycle operation, wherein an exhaust valve of said engine is opened at the bottom of the cycle and

kept open on the up stroke of said cycle, while an intake valve is opened slightly before top dead center and held open as a piston goes over its topmost position, to allow said TEC working fluid at high pressure into a piston chamber of said engine.

23. The thermal collection system as recited in 5 wherein said condenser is formed by a plurality of automotive radiators.

24. The thermal collection system as recited in 23 wherein said plurality of automotive radiators are cooled by fans blowing ambient air over radiator surfaces.

25. The thermal collection system as recited in 24 wherein said heat exchanger is located submerged in said first tank.

26. The thermal collection system as recited in 5 wherein said expander is in the form of an automobile engine having a drive shaft, and wherein said drive shaft is connected to an electrical generator for generating electricity.

27. A method of thermal collection comprising the steps of:

receiving said relatively hot working fluid from a first tank and for providing same to a heat exchanger,

discharging said working fluid from the heat exchanger at a lower temperature than a temperature of said relatively hot working fluid from said first tank;

collecting solar energy in a solar collector connected for receiving the lower temperature working fluid from said heat exchanger;

heating said lower temperature working fluid in the solar collector;

feeding said heated working fluid from the solar collector to said first tank or to a second tank, containing working fluid at a lower temperature than said first tank; and

feeding working fluid from said second tank to said solar collector.

28. A method of improving the efficiency of removing heat from a solar collector using a relatively hot and relatively cold working fluid pumped through the solar collector and comprising the steps of:

during early morning and late afternoon hours of the day, passing said relatively cold working fluid from a cold working fluid tank to said solar collector and returning the relatively cold working fluid, heated slightly by said solar collector to said cold working fluid tank;

during peak sunlight hours of the day, passing said relatively hot working fluid from a hot working fluid tank to a heat exchanger and then to said solar collector; and

during said peak sunlight hours of the day, additionally passing said relatively cold working fluid to said solar collector together with said relatively hot working fluid.

29. The method of claim 28 wherein the step of additionally passing said relatively cold working fluid to said solar collector includes feeding said relatively cold working fluid to said solar collector at a variable rate which increases as a function of time while approaching a time of maximum solar flux, and decreases as a function of time when going away from said time of maximum solar flux.

30. The method of claim 29 further including the step of adjusting the amount of relatively cold working fluid fed to said solar collector in such a manner as to maintain the output temperature of the working fluid discharged from the solar collector at a maximal value.

31. A method of generating electricity comprising the steps of:

providing a thermal energy conversion (TEC) system comprising a heater/vaporizer, an expander, a condenser and a pump connected in series to pump TEC working fluid through said TEC system;

providing a thermal energy collection and storage system (TCS) comprising a solar collector, a hot TCS working fluid tank storing relatively hot TCS working fluid and a cold TCS working fluid tank storing relatively cold TCS working fluid, and a heat exchanger coupled to said heater/vaporizer of said TEC system;

during early morning and late afternoon hours of the day, passing said relatively cold TCS working fluid from said cold TCS working fluid tank to said solar collector and returning the relatively cold TCS working fluid, heated slightly by said solar collector to said cold TCS working fluid tank;

during peak sunlight hours of the day, passing said relatively hot TCS working fluid from said hot TCS working fluid tank to said heat exchanger and then to said solar collector; and

during said peak sunlight hours of the day, additionally passing said relatively cold TCS working fluid to said solar collector together with said relatively hot TCS working fluid;

heating said TEC working fluid in said heater/vaporizer of said TEC system by said TCS working fluid passing through said heat exchanger; and

coupling an output of said expander to an electrical generator to produce electricity from operation of said TEC system.

32. The method as recited in claim 31 wherein the step of additionally passing said relatively cold TCS working fluid to said solar collector includes feeding said relatively cold TCS working fluid to said solar collector at a variable rate which increases as a function of time while approaching a time of maximum

solar flux, and decreases as a function of time when going away from said time of maximum solar flux and further including the step of adjusting the amount of relatively cold TCS working fluid fed to said solar collector in such a manner as to maintain the output temperature of the TCS working fluid discharged from the solar collector at a maximal value. .